NUTRIENT AND ALGAL DYNAMICS IN THE QUINEBAUG RIVER BASIN, IN CONNECTICUT

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Biographical Sketch

Michael Colombo is a hydrologist with the U.S. Geological Survey and has worked on several water-quality projects in cooperation with the State of Connecticut Department of Environmental Protection (CTDEP). Recent topics include statistical analysis of trends in surface-water quality in Connecticut streams, continuous water-quality monitoring, and assessment of nutrient loads and algal processes in freshwater systems. Michael received both a B.S. and M.S. degree in water resources from the University of Connecticut, College of Agriculture and Natural Resources.

Abstract

The Quinebaug and Shetucket Rivers in Connecticut discharge high levels of nutrients and seston (suspended algae) to the upper Thames River resulting in high levels of biochemical oxygen demand (BOD) and low levels of dissolved oxygen. Large daily fluctuations of pH and dissolved oxygen in the Quinebaug River are believed to be a function of streamflow regulation and primary productivity of seston.

Occurrence and effects of seston primary productivity associated with excess algal growth due to nutrient enrichment were analyzed using bi-weekly monitoring data from mid-May through September, 2000 and 2001 at 7 main stem sites, 5 tributaries, and 4 municipal sewage treatment plants. The bi-weekly sampling scheme with the addition of monthly samples October through April enabled calculation of monthly and annual nutrient loads. This understanding of sources and attenuation of nutrients within the basin is essential for developing management plans.

Nutrient loads computed for selected reaches were used to identify point and nonpoint nutrient sources in the basin. Preliminary results suggest that during summer low-flow conditions, increased nutrient load is from the municipal sewage treatment plants in the lower Quinebaug Basin. Analysis of the data indicates multiple algal blooms may move through the basin from late summer through early fall. This movement of algae supports the idea that the system is dominated by seston, rather than periphyton (benthic algae). The data collected during this study will be useful in developing TMDLs and contribute understanding of nutrient and algal dynamics in watershed systems that can be applied to regionalized modeling efforts.